

October 8, 2008

## **MEMORANDUM**

TO: Mark Mason, P.E.  
Engineering Manager, Boise Regional Office

FROM: Steve Ogle, P.E.  
Boise Regional Office

SUBJECT: Staff Analysis for Draft Wastewater Reuse Permit LA-000174-03 (Municipal Wastewater)  
Hidden Springs Sewer Company, LLC

### **1. PURPOSE**

The purpose of this memorandum is to satisfy the requirements of the *Rules for the Reclamation and Reuse of Municipal and Industrial Wastewater (Reuse Rules)*, IDAPA 58.01.17.400.04, for issuing wastewater reuse permits (WRPs). This memorandum addresses draft WRP No. LA-000174-03, for the municipal wastewater treatment and reuse system for the Hidden Springs Development, owned and operated by Hidden Springs Sewer Company, LLC (Hidden Springs). The Hidden Springs treatment and reuse system is currently operated under the terms of WRP No. LA-000174-02, which will be replaced by the draft permit upon final issuance.

### **2. SUMMARY OF EVENTS**

In August of 2006, the Department of Environmental Quality (DEQ) received a preliminary engineering report (PER) for a capacity expansion project to the existing wastewater treatment plant (WWTP) serving the Hidden Springs Development, located 3 miles north of the City of Boise. The PER proposed addition of a new treatment cell, referred to as Cell 1a; a new storage lagoon, Cell 3a; and improvements to the disinfection/chlorination system. The purpose of the expansion project was to add treatment capacity sufficient to manage wastewater from the Phase 8 expansion of the Hidden Springs Development, as well as all wastewaters that will be generated from a future development adjacent to Hidden Springs Development, currently referred to as Cartwright Ranch. The PER was approved by DEQ in a letter dated October 6, 2006, and plans and specifications for the project were subsequently received in January of 2007. DEQ approved the plans and specifications for the expansion project in a letter dated March 16, 2007. Seepage testing reports for Cell 1a and Cell 3a were approved by DEQ in October of 2007. Record drawings for the completed project were received by DEQ on December 4, 2007.

On January 3, 2008, representatives from Hidden Springs and DEQ met to discuss permit modifications that would be necessary to allow use of the newly added WWTP capacity. The facility's permit contains a limit on the allowable volume of influent to the WWTP, as well as limits for the amount of reclaimed effluent that can be produced, effectively preventing the newly-constructed expansion capacity from being put into use without a permit modification. Additionally, it was unclear that the facility had sufficient, permitted acreage available to manage the total volume of effluent associated with the expansion project. Representatives also discussed several issues related to the findings of DEQ's review of the facility's 2006 Annual Report, including: 1) a recent trend of total suspended solids (TSS) excursions related to re-occurring algae blooms in the lagoon system, 2) the apparent lack of a dedicated Operations and Maintenance (O&M) Manual for the effluent distribution/irrigation systems, and 3) various inconsistencies and/or uncertainties associated with the arrangement, operation, and monitoring of hydraulic management units (HMUs). For additional details regarding these issues, refer to DEQ's 2006 annual report review, issued under cover letter dated December 11,

2007.

Additional meetings were held on February 6<sup>th</sup>, March 20<sup>th</sup>, and April 1<sup>st</sup> of 2008, to discuss various aspects of Hidden Springs' proposals for addressing DEQ's concerns. Hidden Springs ultimately proposed to develop and submit: 1) an early permit renewal application to incorporate the expanded capacity of the WWTP, including a hydraulic balance demonstrating sufficient acreage to manage the effluent, 2) a dedicated O&M Manual for the effluent distribution/irrigation system, 3) a TSS Management Plan to address the effluent quality from the WWTP, and 4) an Irrigation System Evaluation intended to improve operation of the effluent distribution/irrigation systems. DEQ received irrigation water requirement (IWR) calculations demonstrating that there was sufficient acreage necessary to manage all effluent from the WWTP on February 18, 2008; the TSS Management Plan on March 21, 2008; a Preliminary O&M Manual on April 22, 2008; and a permit renewal application on April 29, 2008. In early May of 2008, Hidden Springs formally contracted CENTRA Consulting, Inc. to perform an evaluation of the distribution/irrigation system, identify improvements necessary to tighten operations, and ensure that proper buffer zones were observed and/or implemented onsite. A draft summary of these findings, as well as a plan for corrections to specific issues identified therein, was submitted to DEQ on August 15, 2008.

The permit renewal application was formally determined to be complete in a letter from DEQ dated July 10, 2008, and the documents discussed in the preceding paragraph were used to develop draft WRP No. LA-000174-03 for a public review and comment period. After the public review period is closed, DEQ will provide written responses to all relevant comments and prepare a final permit for Hidden Springs' wastewater reuse facilities.

### **3. SITE AND PROCESS DESCRIPTIONS**

The wastewater treatment and reuse facilities for this project are contained within the boundaries of the Hidden Springs Development, and are owned, operated, and maintained by Hidden Springs Sewer Co. The Hidden Springs Development consists of approximately 1844 acres located 3 miles north of the City of Boise, largely within Dry Creek Valley in Ada County, between Cartwright Road and Seaman's Gulch Road. Terrain in this area is variable, transitioning from the Dry Creek Valley floor to rolling foothills to the mountainous Boise Front, and ranging from 2692 feet to over 6,000 feet above sea level in elevation. Prior to the Hidden Springs Development, this area was primarily used for agriculture and grazing purposes. Refer to Appendix 2 of the draft permit for vicinity and site maps, as well as a process schematic of the WWTP.

#### **3.1 Soils Evaluation**

Section 3.5 of the WRP renewal application contains a detailed discussion of the soils present on the Hidden Springs site. Soil survey data cited from the Natural Resources Conservation Service (NRCS) indicates that soils consist of approximately 43 percent Drax Loam, 26 percent Haw-Lankbush Complex, 15 percent Brent-Ladd Loams, with the remaining balance being a mixture of other, similar loams and sandy loam soils. The dominant soil types tend to be deep (i.e., 60" or more) and moderately to well-drained, with some potential for rapid runoff and erosion. The WRP renewal application also cites site-specific data obtained onsite from 6 test pits excavated in 1997. This work indicated the widespread presence of loams, sandy loams, and sandy clay loam, but classified the soil type as Collister-Flofeather Complex (i.e., similar to NRCS classifications, with slightly higher permeability and lower organic content).

Analytical soils data collected under the monitoring requirements of the current permit includes data from the two agricultural soil monitoring units (i.e., SU-017401 and SU-017405). The 2007 soils data showed moderate phosphorous concentrations (i.e., <25 ppm) on SU-017401, and high to very high phosphorous concentrations associated with SU-017405. Nitrate data indicated relatively low concentrations (i.e., <5 ppm) on SU-017401,

while concentrations on SU-017405 are notably higher and range from high to very high (i.e., >26 ppm and >40 ppm, respectively) in classification. Soils data from 2006 showed similar concentrations to the 2007 data, although the nitrate levels in soils on SU-017405 appear to have increased slightly. Soils data from 2004 showed similar trends to the 2006 and 2007 data. Due to relatively low loading rates of nitrogen and phosphorous associated with reclaimed effluent applications, the elevated nitrate and/or phosphorous soil concentrations have generally been attributed to fertilizer applications in DEQ's past evaluations of these sites under Hidden Springs' previous permits.

No soil monitoring has historically been required by permit for the non-agricultural HMUs; however, soil data for these sites was reported to DEQ in 2004. Due to the large volume of data, there is a wide range in the reported nitrate and phosphorous values, but DEQ notes the existence of high phosphorous concentrations on many of these sites, while nitrate concentrations largely fell into the low category. The elevated phosphorous trends were also linked to fertilizer application, rather than effluent application, in the staff analysis for draft version of WRP LA-000174-02.

### **3.2 Surface Water Evaluation**

Dry Creek runs through the Hidden Springs Development, generally to the northwest across the site. There are other minor creeks/drainages onsite that feed into Dry Creek. Past the Hidden Springs Development, Dry Creek eventually drains into the Boise River. Dry Creek was historically used for agricultural irrigation and/or watering livestock prior to the Hidden Springs Development. Flows in Dry Creek and its tributaries vary seasonally with spring runoff events, with lowest flows occurring in late summer and fall. The WRP application indicates that high flows may approach 300 feet per second in the spring runoff season.

Dry Creek is currently a non-designated surface water body, in accordance with IDAPA 58.01.02.101.01 of the *Water Quality Standards*, and has presumed beneficial uses of cold water aquatic life and primary or secondary contact recreation.

### **3.3 Ground Water Evaluation**

Section 3.4 of the WRP application contains a brief discussion of the regional geology/hydrogeology in the Dry Creek Valley. The permit application notes that there is a shallow, unconfined aquifer within the alluvial fill found throughout the valley bottom, typically 4 to 6 feet below the ground surface (bgs); although the start of the irrigation season in mid- to late-April of each year causes these levels to rise to within one foot of the surface. The previous permit renewal application indicated that the shallow aquifer has typically been used for irrigation, with some limited domestic purposes. Monitoring wells used to collect information for the initial Hidden Springs permit application are no longer in use (i.e., ground water monitoring has not historically been required for this site), but indicated elevated concentrations of total dissolved solids (TDS), total coliform, and to an extent, nitrate. The elevated concentrations are generally thought to be a result of past agricultural practices onsite.

There is a deeper, regional aquifer associated with a permeable sand formation located up to 300 feet bgs. Wells completed within this deeper aquifer exhibit static water levels of 40-184 feet bgs. This aquifer serves as the principle drinking water supply for the area, with numerous private and municipal wells in existence.

A deeper, geothermal aquifer appears to exist from depths of 350 to 1000 feet bgs, within the volcanic rocks along the foothills fault system.

### **3.4 Process Description**

Raw sewage is collected in a gravity system, passed through a grinder and Parshall flume, and pumped by lift

station to the WWTP. Hidden Springs' municipal WWTP consists of 3 aerated/facultative treatment lagoons, 2 storage lagoons, tertiary sand filtration, and sodium hypochlorite disinfection. A process schematic is contained in Appendix 2 of the draft permit. Treated effluent is used exclusively for irrigation purposes within Hidden Springs Development during the growing season. Treated effluent is kept in storage during the non-growing season.

As previously indicated, the third treatment cell and second storage lagoon were constructed in 2007. The expansion also involved installation of a dedicated, 755,000 gallon chlorine-contact tank. The expansion project effectively increased the total capacity of the treatment system to 274,500 gallons of influent per day and increased the system's total available storage capacity to 45.1 million gallons. Additional technical information regarding the treatment system can be obtained from DEQ's files at the Boise Regional Office.

### 3.5 Wastewater Evaluation

Prior to the 2007 expansion project, the Hidden Springs WWTP was anticipated to serve approximately 722 homes, a school, and some commercial development; however, the expansion project has increased this to 1525 residential connections, a 550-student school, and some commercial use. The WWTP was expanded to treat all wastewaters from the Hidden Springs Development through Phase 8, as well as wastewater from the adjacent Cartwright Ranch development, based on a projected, average-day flow of 180 gallons/day/residence.

Section 4 of the WRP application contains average, annual concentration values for selected effluent constituents, based on 2007 data. The staff analysis for the previous permit presented similar data based on 2003-2004 data. These two datasets are presented together in Table 3.1.

**TABLE 3.1: Averaged Constituent Concentrations in Treated Effluent**

Constituent	2003-2004 Average (mg/L) <sup>a</sup>	2007 Average (mg/L) <sup>b</sup>
Chemical Oxygen Demand	37.3	41.2
Total Kjeldahl Nitrogen	2.4	7.5
Nitrate	1.2	5.5
Total Nitrogen	3.6	13.0
Total Phosphorous	2.5	6.7
Total Dissolved Solids	553	510

<sup>a</sup>Taken from DEQ's staff analysis for draft Permit LA-00172-02, dated June 17, 2005.

<sup>b</sup>Taken from Hidden Springs Permit Renewal Application, April 28, 2008, CENTRA Consulting, Inc.

While average chemical oxygen demand (COD) and TDS concentrations appear to remain relatively similar over these timeframes, the average nitrogen and phosphorous concentrations in the treated effluent appear to have increased rather substantially. The renewal application also notes this increase in effluent concentrations of nitrogen and phosphorous, as well as the associated increase in loading rates of these constituent (i.e., refer to discussion in Section 7.0 of the renewal application); however, no specific reason(s) for the increase in effluent concentrations was identified.

DEQ notes that a marked increase in effluent concentrations of these two constituents appears to have first occurred in analytical data reported for the 2006 season, although the specific reason for this increase remains unclear at the present time. Hidden Springs has consistently reported problematic algae blooms occurring within the storage lagoons since 2005; however, it is unknown if this issue is directly linked to the increase in nutrient concentrations in the treated effluent.

## 4. REGULATORY DISCUSSION

This section discusses regulatory and technical basis for terms and conditions contained in the draft version of

WRP No. LA-000174-03. Administrative changes and/or similar, non-technical aspects of the draft permit (e.g., Sections A-D, I, and J of the permit) are not specifically addressed within this document.

#### **4.1 Compliance Schedule for Required Activities – Section E**

The following compliance activities have been implemented within the draft WRP to address various regulatory issues and/or update permit materials to reflect the current status of facility operations.

##### **4.1.1 Reuse Area Expansions**

Compliance Activity CA-174-01 requires that plans (e.g., site map, distribution system design, buffer objects, etc.) be submitted for DEQ approval prior to modification or expansion of any permitted application areas. Although included in the renewal permit as permitted HMUs where effluent application is allowed, there are currently sections of the Natural Open Space Areas (i.e., HMU-017406) that are not presently equipped with any distribution systems. These areas have been permitted to ensure that the reuse system has sufficient acreage available for hydraulic management of treated effluent as the developments grow over time, but will still require plan and specification approval of the site and distribution system design prior to installation of irrigation equipment.

##### **4.1.2 Plan of Operation**

A preliminary O&M Manual for the reuse system was submitted to DEQ on April 22, 2008. As part of the permit renewal process, DEQ has conducted a review of the O&M Manual and found that it substantially satisfies the requirements of the current permit (i.e., Compliance Activity CA-174-02 of Permit LA-000174-02); however, certain terms and requirements in the renewal permit have been changed from those appearing in the current permit, and the O&M Manual will need to be updated to reflect these changes. Additionally, final resolution of several ongoing issues regarding the distribution systems (e.g., O&M procedures, pressure fluctuations, buffer zoning, etc.), further discussed in the following section of this document, may impact procedures within the O&M Manual. Finally, DEQ notes that the April 2008 O&M Manual does not specifically address the effluent monitoring/sampling requirements of the permit, or address the sampling procedures to be used by operators (i.e., sampling procedures discussed in the O&M Manual are limited to soil sampling protocols). These issues should be captured within the O&M Manual to ensure proper system operation and permit compliance; therefore, Compliance Activity CA-174-02 of the renewal permit requires that an updated O&M Manual be submitted to DEQ for review and approval within one year of permit issuance.

##### **4.1.3 Plan for Permit Compliance**

On August 15, 2008, while in the final stages of preparing the draft renewal permit, DEQ received a draft report detailing the findings of the 2008 evaluation of Hidden Springs' reuse/distribution system. This document, entitled Plan of Permit Compliance, indicates that effluent data available to date for the 2008 season has consistently met Class B effluent requirements, and contains a series of specific proposals intended to address and/or rectify several issues that were identified during the course of the evaluation. Included among these proposals are the following: 1) the use of a dedicated spreadsheet, which calculates irrigation application times based upon actual flow rates and crop IWRs, to manage the irrigation control system to provide even, consistent flows; 2) additional investigation into four potential causes of pressure fluctuations identified within the distribution system; 3) implementation of a late-night irrigation schedule (i.e., between midnight to 6:00 AM) for areas where distribution systems are located within 20 feet of occupied residences, along with increased operator oversight to identify any problem areas that might require low flow/low trajectory nozzles and/or pressure control to eliminate effluent application outside of permitted HMUs; and 4) the use of berming and adjustments to, or

removal of, specific sprinkler heads located along Dry Creek to prevent any effluent discharge or drift into surface waters. DEQ reviewed these proposals as part of the permit renewal process, and generally concurs with the evaluation findings and the corrective approaches recommended in the draft plan.

Compliance Activity CA-174-03 requires that a final plan be developed and submitted within 6 months of final permit issuance. This is intended to provide Hidden Springs with an opportunity to review the terms of the permit after final issuance, and ensure that the plan is properly integrated with the permit and will adequately address DEQ's expectations for the reuse system. The compliance activity also requires that status updates be provided to DEQ as needed, or within each annual report at a minimum.

#### 4.1.4 Renewal Permit Application

Compliance Activity CA-174-04 in the permit requires Hidden Springs to submit a permit application renewal package within six months of the permit's expiration date, which will be formalized and documented on the cover page of the permit upon final issuance.

### 4.2 **Site-Specific Permit Conditions – Section F**

#### 4.2.1 Application Season Restriction

Section F of the WRP restricts application of treated effluent to the growing season (GS). The GS for this site is defined as the period from March 1st through October 31st of each year (refer to the definition in Section C of the WRP). Hidden Springs did not propose any non-season application within the permit renewal application.

#### 4.2.2 Wastewater Treatment and Reuse System Operation Requirement

Section F of the permit requires the wastewater treatment and reuse systems to be operated by personnel certified and licensed in the State of Idaho wastewater operator training program at the operator class level specified in IDAPA 58.01.16.203 of the *Wastewater Rules*, and properly trained to operate and maintain the system. Operation of the wastewater treatment system must be monitored on a 24-hour basis for alarm conditions, including notification of the qualified operating personnel under alarm conditions.

#### 4.2.3 Maximum Influent Flow Rate

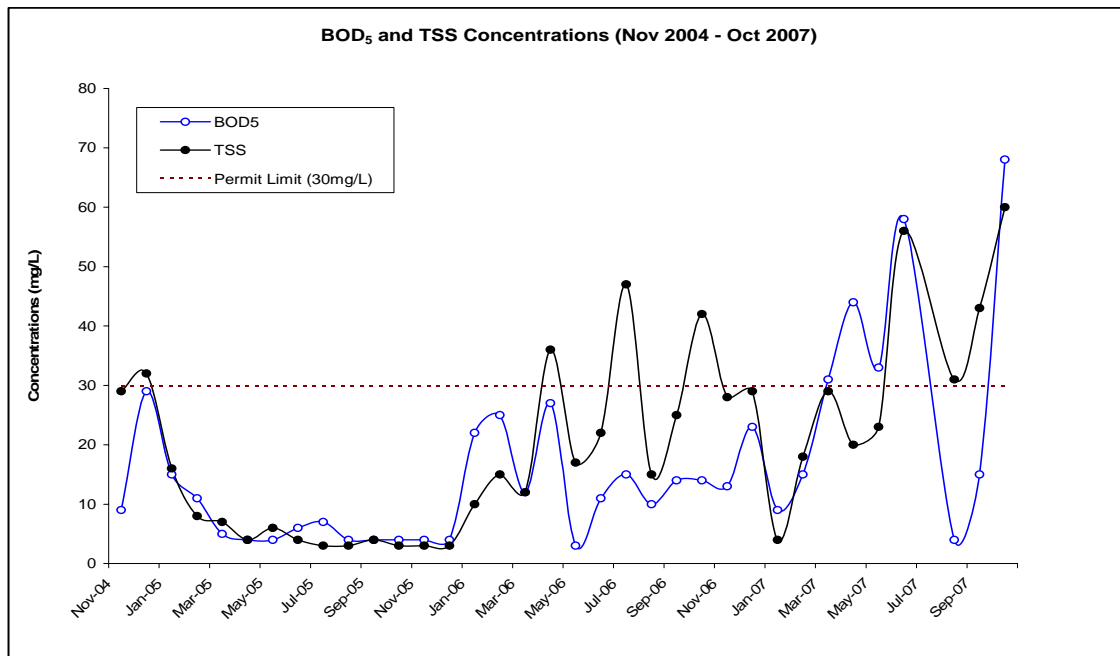
The draft WRP limits the average, annual influent rate to the WWTP to 274,500 gallons per day. This limit is largely intended to prevent the treatment plant from being overloaded beyond its design parameters without prior DEQ approval, and may be modified in the future by submittal of a substantiated request from the permittee.

Section G of the draft WRP requires that the influent volume be monitored and recorded on a daily basis.

#### 4.2.4 Treatment Cell Effluent Requirements

The current WRP (i.e., LA-000174-02) contains reduction criteria and effluent concentration limits for 5-day Biological Oxygen Demand (BOD<sub>5</sub>) and TSS. The concentration limits are 30 mg/L for both constituents in effluent from the treatment cells, based on a monthly average, and an 85% reduction rate is also required across the treatment cells. These criteria were part of the design basis for the WWTP and were included within the permit to ensure that the treatment system was operating properly.

Historical concentration data collected under WRP LA-000174-02 is shown in Figure 4-1.



**Figure 4-1: Treatment Cell Effluent Data from November 2004 Through October 2007**

During the permit renewal process, Hidden Springs WWTP operators requested that DEQ consider inclusion of the BOD<sub>5</sub> and TSS standards as ‘monitoring only’ provisions within the renewal permit (i.e., as a monitoring requirement with no associated permit limit or quantified performance standard). DEQ notes that these two parameters were initial design criteria for the WWTP, and are not derived from nor directly linked to any specific requirement or quality standard contained in the Rules; therefore, slightly higher concentrations (i.e., beyond the design parameters) could likely be allowed with no real risk of adverse impacts to human health or the environment. However, DEQ also notes that excursions in effluent quality in recent years, generally associated with algae blooms in the summer months (refer to Figure 4-1), have a potential to lead to nuisance conditions at the WWTP or adverse impacts to ground water quality over time, if not addressed. This latter issue justifies inclusion of a standard for these two constituents, and DEQ has replaced the existing requirements with a limit of 45 mg/L for BOD<sub>5</sub> and TSS. This value is slightly greater than the design parameters, and is intended to alleviate arbitrary permit compliance issues while ensuring that a high degree of treatment is achieved by the WWTP.

Section G of the permit requires that the BOD<sub>5</sub> and TSS concentrations of treatment cell influent and effluent be monitored on a monthly basis.

#### 4.2.5 Filtration System Effluent Requirements

Per the requirements of IDAPA 58.01.17.600.07.b, the draft permit contains specifications for the instantaneous and 24-hour average turbidity (i.e., 5 and 2 NTUs, respectively) of effluent discharged from the sand filter, prior to chlorination. It should be noted that the current permit does not contain a 24-hour average limit for turbidity, as the permit was issued prior to the existence of this requirement within the *Reuse Rules*. The renewal permit has incorporated the newer Rule requirement, to ensure that proper disinfection rates will be achieved, and also removed the existing TSS monitoring requirements, as discussed below.

Section G of the draft permit requires continual turbidity monitoring. Hidden Springs uses an in-line turbidimeter to monitor this parameter; therefore, in accordance with Section 600.07.b of the *Reuse Rules*, no TSS monitoring is required. The current permit requires TSS monitoring after filtration, but this requirement has been removed from the renewal permit, in accordance with the provisions of the Rules.

#### 4.2.6 Disinfection Requirements

The facility's current permit contains standards for total coliform and residual chlorine; however, the residual chlorine requirement in the permit differs from the Class B requirement that are now specified under the Rule (i.e., the permit contains a residual requirement of 0.5 mg/L, while the Rule specifies 1.0 mg/L). As is further discussed below, the draft renewal permit has been updated to reflect the newer residual requirements of the Rule. No change is needed, or has been implemented within the permit, for the total coliform requirement.

The operators of the Hidden Springs treatment system have requested that the renewal permit maintain the residual limit from the previous permit, citing a good compliance history with the total coliform limit. The monitoring submitted to DEQ under the current permit indicates no test result greater than 2 MPN/100 mL in the 2005 irrigation season; a single hit reported as <23 MPN/100 mL in the 2006 season; and a series of four hits reported as <23 MPN/100 mL (later traced to the use of improper sampling containers), along with a single hit reported as 9 MPN/100 mL during the 2007 season. Although it appears that the system is achieving an acceptable rate of disinfection with the 0.5 mg/L residual chlorination standard, DEQ is constrained by the standard contained within the Rule, and the 1.0 mg/L requirement does appear within the renewal permit. If Hidden Springs desires to keep the lower residual requirement in place, a waiver request, as outlined at IDAPA 58.01.17.940 of the Rule must be submitted to DEQ for consideration. In lieu of an approved waiver request, DEQ will require that Hidden Springs comply with the increased residual standard upon issuance of the final renewal permit.

The associated monitoring requirements for these two permit conditions include daily sampling requirements for chlorine residual and total coliform when reclaimed effluent is being utilized for irrigation purposes. Although the current permit only requires coliform sampling three times a week, IDAPA 58.01.17.600.07.b requires daily sampling for this parameter and this standard now appears in the renewal permit.

#### 4.2.7 Ground Water Quality Requirement

The permit requires that wastewater reuse activities conducted by the permittee not cause a violation of the *Ground Water Quality Rule*, IDAPA 58.01.11. This permit condition is intended to ensure that the facility's wastewater reuse operations comply with the *Ground Water Quality Rule*.

#### 4.2.8 Hydraulic Loading Rate Limit, Each Hydraulic Management Unit

As indicated previously, Hidden Springs uses growing season (GS) irrigation to disperse all treated effluent from the WWTP to permitted areas within Hidden Springs Development. Although the current permit for this facility only applies a hydraulic loading rate limit to agricultural areas, the draft renewal permit applies this limit to each permitted HMU to prevent unintentional hydraulic overloading of any site. This change was implemented to limit the potential for adverse impacts to ground water quality that can occur if sites are over-irrigated. As discussed in Section 3.1 of this document, elevated nitrate levels have been noted in some HMUs in recent years; this constituent can be driven into ground water if sites are hydraulically overloaded.

Current WRP guidance typically specifies that the GS hydraulic loading rate should substantially approximate the IWR for crop(s) grown on each HMU. Section E of the WRP specifies the IWR as the GS hydraulic loading rate applicable to each HMU. Permitted HMUs are defined in Appendix 1 of the WRP.

Section C of the permit defines IWR as “[a]ny combination of wastewater and supplemental irrigation water applied at rates commensurate to the moisture requirements of the crop, and calculated monthly during the growing season. Calculation methodology for the IWR can be found at <http://www.kimberly.uidaho.edu/water/appndxet/index.shtml>. The equation used to calculate the IWR at this website is:

$$\text{IWR} = (\text{CU} - \text{P}_e) / \text{E}_i$$

Where: CU is the monthly consumptive use for a given crop in a given climatic area. CU is synonymous with crop evapotranspiration;

$\text{P}_e$  is the effective precipitation. CU minus  $\text{P}_e$  is synonymous with the mean net irrigation requirement (IR);

$\text{E}_i$  is the irrigation system efficiency. To obtain the gross irrigation water requirement (IWR), divide the IR by the irrigation system efficiency.”

Hydraulic application rates to each HMU should generally follow the IWR for the specific crop(s) grown throughout the season. It should be noted that any significant deviation from the IWR during the GS should be addressed and explained within the narrative interpretation of the subsequent Annual Report submitted for that season (refer to Reporting Requirement No. 1 in Section H of the permit).

Section G of the permit requires Hidden Springs to monitor both the effluent and supplemental water applied to each HMU daily when such applications occur. These requirements should be sufficient to monitor compliance with the hydraulic loading rate limits.

#### 4.2.9 Maximum Nitrogen Loading Rate Limit, Natural Open Space Areas

The renewal application presented an analysis of potential constituent loading rates, based upon 2007 constituent data and crop-specific IWRs. Literature values for annualized crop uptake rates were also used to project potential nitrogen and COD loading limits, based on 150% of crop uptake and 50 pound/acre-day as allowable loadings, respectively. Based on a comparison of these two parameters, it appears that the only sites with a potential for loading rates to exceed an allowable limit are the Natural Open Space areas (i.e., HMU-017406). These sites will exceed the 150% of crop uptake limit for nitrogen loading if irrigated at the IWR with reclaimed effluent; the application observes that this effect is due to the relatively low crop uptakes associated with these sites. As discussed in Section 3.1 of this document, there are also indications that nitrate concentrations in soils in these areas are elevated. Elevated soil concentrations combined with the possibility for over-application of nitrogen increases the potential for nitrate to migrate into ground water beneath the sites and degrade ground water quality. Consequently, the draft permit contains a maximum, annual nitrogen loading rate limit of 150% of typical crop uptake for the Natural Open Spaces, applied to loadings from all sources (i.e., reclaimed effluent, fertilizers, etc.).

Section G of the permit requires monthly sampling of reclaimed effluent for Total Kjeldahl Nitrogen and nitrate-nitrogen. This section also requires that Hidden Springs calculate the annual nitrogen loading rate to each HMU on an annual basis, and collect soil samples from the agricultural and natural open space HMUs each spring for nitrate-nitrogen and ammonium-nitrogen. These monitoring parameters should be sufficient to ensure proper oversight and management of these areas.

#### 4.2.10 Phosphorous Loading

No phosphorous loading rate is contained in the draft WRP, and no such conditions appeared in any prior permit for this facility. Phosphorous is of concern with respect to surface waters, and Hidden Springs manages the effluent distribution systems such that no direct discharge to surface waters is allowed. Some monitoring conditions related to phosphorous are contained within the draft permit (discussed below); however these conditions are largely intended to allow proper site management with respect to effluent loading rates and fertilizer applications.

Section G of the WRP requires monthly sampling of reclaimed effluent for total phosphorous, calculation of the annual phosphorous loading rate to each HMU, and soil samples from the agricultural and natural open space HMUs each spring for plant available phosphorous. This will ensure proper characterization of phosphorous loading rates and soil parameters, which will allow optimal site management with respect to phosphorous.

#### 4.2.11 Total Dissolved Solids Loading

No TDS loading rate limit is contained in the draft WRP, and no such conditions appeared in any prior permit for this facility. The high quality of the reclaimed effluent associated with this facility should prevent the occurrence of any issues related to TDS loading rates onsite.

Section G of the WRP does require monthly sampling of reclaimed effluent for TDS concentrations, but this condition is intended to allow regulatory oversight of the effectiveness of the treatment process, and is not directly tied to any effluent requirement or loading rate limit in the permit.

#### 4.2.12 Buffer Zones Requirements

The buffer zone requirements of the draft permit are similar to those in the current permit, although the buffer zone requirements for surface water bodies and inhabited dwellings have been increased to reflect the distances specified in DEQ's guidance document. It must be noted the current and previous permits for Hidden Springs did not require any buffer zones to these features, and several of the distribution systems installed during this time will be within the new buffer zone requirements contained in the renewal permit; however, these sites have been identified during the 2008 growing season, and the draft Plan for Permit Compliance (refer to Section 4.1.3 of this document) contains preliminary plans for addressing this situation. Consequently, the draft permit makes an allowance for these existing systems, where approved through the Plan for Permit Compliance. Any new distribution systems that are installed after final issuance of the renewal permit will generally be required to comply with the new buffer zones or be specifically addressed within the approved Plan for Permit Compliance.

#### 4.2.13 Posting/Access Restriction Requirements

The posting requirements and access restrictions from the previous permit have largely been carried over into the renewal permit. These conditions generally require all distribution systems/components and areas irrigated with effluent to be posted, as well as public access restrictions from reclaimed wastewater facilities.

#### 4.2.14 Irrigation Scheduling Requirement

Irrigation of reclaimed effluent on Landscape Irrigation and Public Access Areas is generally required to occur during periods of non-use by the public. Agricultural and Natural Open Space Areas do not

require restricted irrigation scheduling. The previous permit specifically defined periods of non-use as the hours between 8:00 PM and 8:00 AM, or from sunset to sunrise, whichever is less restrictive. This language was not included the renewal permit, as specific timeframes are now identified under the Plan for Permit Compliance.

#### 4.2.15 Runoff and Wellhead Protection Requirements

Section F of the renewal permit contains runoff and wellhead protection requirements that did not appear in the previous permits for this facility. The new permit requirement specifically requires that best management practices (BMPs) be applied in accordance with the Plan for Permit Compliance (refer to Section 4.1.3 of this document). During the 2008 distribution system evaluation, it was noted that berming is required along specific areas of Dry Creek to ensure that no run-off would occur, and this recommendation was included in the draft Plan for Permit Compliance. The permit requirement is generally intended to ensure that this recommendation is followed onsite.

#### 4.2.16 Supplemental Irrigation Water Protection Requirement

This requirement mandates installation of a DEQ-approved backflow prevention device, where fresh and wastewater interconnections exist in the reuse systems, to prevent contamination of the fresh irrigation water source. This is intended to assist with ongoing regulatory oversight of the reuse system and/or associated operations.

Section G of the permit requires that all supplemental irrigation pumps directly connected to the wastewater distribution system be backflow tested annually.

#### 4.2.17 Grazing Restriction/Management Plan Requirement

The permit requires submittal and DEQ-approval of a grazing management plan prior to implementation of any grazing activities onsite. Hidden Springs has not submitted any such plan or expressed any interest in conducting such operations at the present time.

#### 4.2.18 Odor Management Requirement

The draft WRP requires that the wastewater treatment plant, land application facilities, and other operations associated with the facility not create a public health hazard or nuisance conditions, including odors. No odor complaints related to the Hidden Springs WWTP have been received by DEQ to date.

#### 4.2.19 Construction Plans Requirement

The WRP requires Hidden Springs to submit plans and specification for DEQ review and approval, prior to construction or modification of any wastewater facilities associated with the reuse system. This is a requirement of the Wastewater Rules, IDAPA 58.01.16, and was included in the permit to ensure ongoing regulatory oversight of any future modifications to the wastewater treatment and/or reuse facilities.

### 4.3 **Monitoring Requirements – Section G**

The monitoring provisions of the WRP are contained in Section G of the permit. These conditions are needed to assess and/or establish ongoing compliance with site-specific permit requirements of Section F, and were identified and discussed in preceding sections of this document.

#### **4.4 Reporting Requirements – Section H**

Section H of the permit contains the Annual Report requirements for the land application sites. Essentially, the Annual Report should contain results from all work conducted during the previous annual period for each monitoring requirement listed in Section G of the permit. This section also contains reporting requirements for all compliance activities contained in the permit.

#### **5. RECOMMENDATIONS**

Based on review of applicable state rules, staff recommends that DEQ issue draft WRP No. LA-000174-03 for a public review and comment period. The draft permit contains effluent quality requirements for the wastewater treatment system, as well as terms and conditions required for operation of the reuse systems. Monitoring and reporting requirements to evaluate system performance and to determine permit compliance have been specified, and compliance activities recommended in the staff analysis have been incorporated into Section E of the permit.